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Ramp Compression Experiments

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The past several years have seen dramatic improvements in dynamic ramp compression experiments to measure stress-density using laser and pulsed-power drivers (figure 1). Goals for future experiments center on achieving higher pressures while keeping the samples in a solid phase, and applying additional diagnostics to probe the materials.

We developed a new laser driven ramp compression technique capable of achieving pressures of 1500 GPa in diamond.² This new ramp-drive technique has been used recently in a variety of experiments including the equation of state of metals and x-ray diffraction. We will present recent results on the EOS of tantalum, and diffraction of iron.

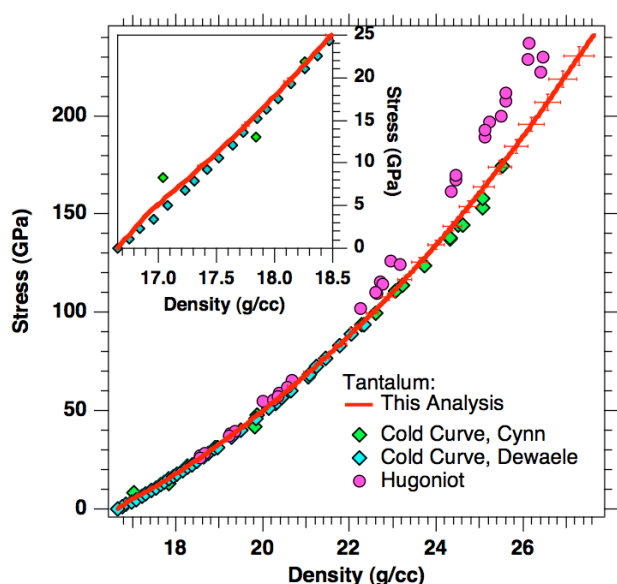


Figure 1. Pulsed-power-driven ramp compression data for tantalum taken at the Z-machine.¹

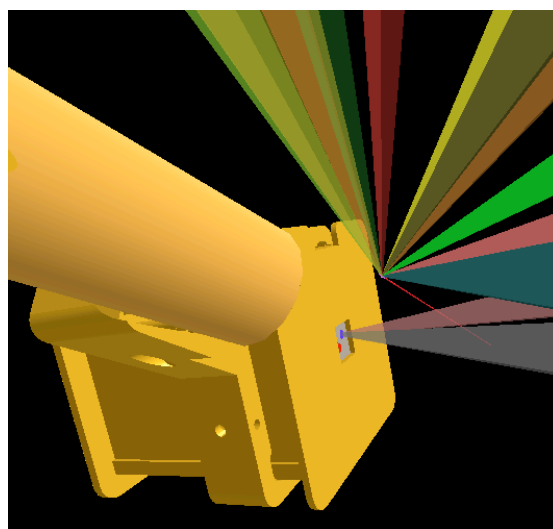


Figure 2. Powder X-ray diffraction target and beam configuration shot at the Omega laser.

* eggert1@llnl.gov This work performed under the auspices of the U.S. DOE by LLNL under Contract DE-AC52-07NA27344.

References

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